CLAIMS

1. A load sensor comprising:

a substrate;

a glass layer provided on the substrate;

a wiring provided on the glass layer;

an adjusting layer provided on the glass layer; and

a strain-sensitive resistor element provided on the adjusting layer and connected to the wiring,

wherein a thermal expansion coefficient of the adjusting layer is closer to a thermal expansion coefficient of the strain-sensitive resistor element than a thermal expansion coefficient of the glass layer.

2. The load sensor as defined in claim 1, wherein the glass layer includes crystallized glass.

3. The load sensor as defined in claim 1, further comprising an internal electrode provided in the glass layer.

4. The load sensor as defined in claim 1, wherein a difference between the thermal expansion coefficient of the substrate and the thermal expansion coefficient of the strain-sensitive resistor element is not less than $10\times10^{-7}/°C$ and is less than $50\times10^{-7}/°C$.

5. The load sensor as defined in claim 1, wherein a difference between the thermal expansion coefficient of the substrate and the thermal expansion coefficient of the glass layer is less than $20\times10^{-7}/°C$.

6. The load sensor as defined in claim 1, wherein a difference between the thermal expansion coefficient of the strain-sensitive resistor element and the thermal expansion coefficient of the adjusting layer is less than $20\times10^{-7}/^{\circ}C$.

7. The load sensor as defined in claim 1, wherein the adjusting layer has a thickness which is not smaller than 1μm and is smaller than 500μm.

8. The load sensor as defined in claim 1, wherein the adjusting layer has an area which is not smaller than 0.1mm×0.1mm and is smaller than 50mm×50mm.

9. The load sensor as defined in claim 1, wherein the adjusting layer has an area larger than an area of the strain-sensitive resistor element.

10. The load sensor as defined in claim 1, wherein the wiring includes a portion provided on the adjusting layer.

11. The load sensor as defined in claim 1, wherein the strain-sensitive resistor element has a thickness which is not smaller than 1μm and is smaller than 500μm.

12. The load sensor as defined in claim 1, wherein the adjusting layer has a thickness which is not smaller than 1μm and is smaller than 500μm.

13. The load sensor as defined in claim 1, wherein the glass layer has a thickness which is not smaller than 10μm and is smaller than 500μm.

14. The load sensor as defined in claim 1, wherein the resistor element has an area which is not smaller than $0.01mm^2$ and is smaller than $2{,}500mm^2$.

15. The load sensor as defined in claim 1, wherein the substrate comprises metal having a thermal expansion coefficient which is not smaller than $80\times10^{-7}/°C$ and is smaller than $200\times10^{-7}/°C$.

16. The load sensor as defined in claim 1, wherein the substrate comprises metal plate die-cut with a mold to have a predetermined shape.

17. The load sensor as defined in claim 1, wherein a gauge factor of the strain-sensitive resistor element is not smaller than 10 and is smaller than 1,000.

18. The load sensor as defined in claim 1, wherein the adjusting layer comprises glass.

19. The load sensor as defined in claim 1, wherein the adjusting layer comprises composite glass including 5wt% to 40wt% of ceramic filler.

20. The load sensor as defined in claim 19, wherein the ceramic filler comprises ceramic powder having a particle diameter which is not smaller than 0.01μm and is smaller than 10μm.

21. The load sensor as defined in claim 19, wherein the ceramic filler

comprises at least one of alumina, zirconia, magnesia, titania, barium titanate, and calcia.

22. A method of manufacturing a load sensor, comprising:

forming a glass layer on a substrate made of metal;

providing glass paste;

forming an adjusting layer by applying the glass paste onto the glass layer and firing the applied glass paste;

forming a plurality of wirings on the adjusting layer; and

forming a strain-sensitive resistor element connected among the plurality of wirings by applying resistor element paste onto the adjusting layer and firing the resistor element paste, wherein a thermal expansion coefficient of the adjusting layer is closer to a thermal expansion coefficient of the strain-sensitive resistor element than to a thermal expansion coefficient of the glass layer.

23. The method as defined in claim 22, further comprising

forming a protective layer covering the strain-sensitive resistor element and respective portions of the plurality of wirings.

24. The method as defined in claim 22, wherein the substrate has a thickness not smaller than 1mm.

25. The method as defined in claim 22, wherein said forming the strain-sensitive resistor element comprises firing the applied resistor element paste at a temperature which is not lower than 400°C and is lower than 1,000°C.

26. The method as defined in claim 22, wherein said forming an adjusting layer comprises firing the applied glass paste at a temperature ranging from 400°C to 900°C.

27. The method as defined in claim 22, wherein the glass paste includes 5wt% to 40wt% of ceramic powder dispersed therein.

28. The method as defined in claim 22, wherein said providing the glass paste comprises:

dispersing ceramic powder in solvent and binder as to have a viscosity which is not smaller than 0.01 poises and is smaller than 100 poises; and

dispersing glass powder in the solvent and the binder including the ceramic powder dispersed therein to have a viscosity which is not smaller than 100 poises and is smaller than 10,000 poises

29. The method as defined in claim 22, wherein said providing the glass paste comprises:

dispersing ceramic powder in solvent and dispersant as to have a viscosity which is not smaller than 0.01 poises and is smaller than 100 poises; and

dispersing glass powder in the solvent and the dispersant including the ceramic powder dispersed therein as to have a viscosity which is not smaller than 100 poises and is smaller than 10,000 poises

30. The method as defined in claim 22, wherein said forming the glass

layer comprises

forming a glass layer including an electrode therein.